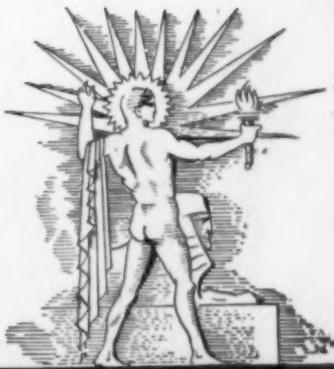
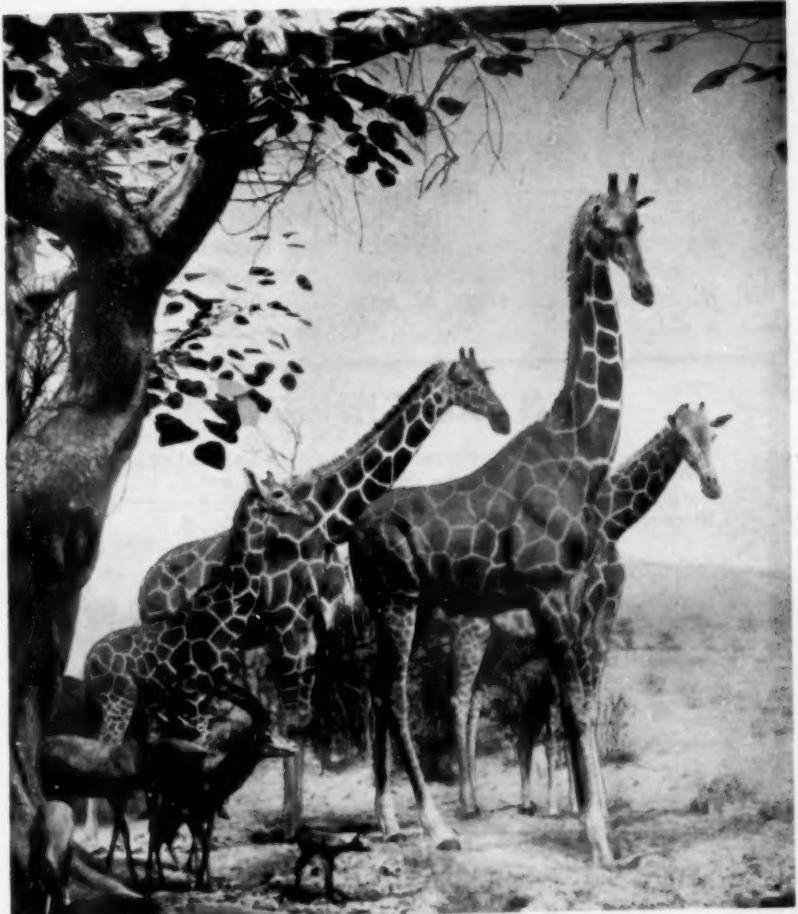


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SCIENCE NEWS LETTER

NOV 7 - 1932

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



NOVEMBER 5, 1932

Abyssinia in Chicago

See Page 287

A

SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXII

No. 604

The Weekly
Summary of Current
Science
Published by
SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years, \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

In requesting change of address, please give old as well as new address.

Advertising rates furnished on application.

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Members of the American Association for the Advancement of Science have the privilege of subscribing to the SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A. A. A. S., Smithsonian Institution Building, Washington, D. C.

Publication Office, 1930 Clifton Ave., Baltimore, Md. Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: SCIENCE, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

? DO YOU KNOW THAT ?

In the Hopi Indian ceremonial calendar more than one-third of the year is occupied in religious rituals.

Aluminum window panes, manufactured in Germany, are said to be so transparent that they may be used like glass.

The house cat, first domesticated by the Egyptians, was not known to the ancient Hebrews, Assyrians, or Babylonians.

A blacksnake that was robbing a woodpecker's nest met retribution when it was attacked by honey bees and died of the stings.

A fragment of one of the old Roman bulletins, that were written on marble and posted in important places, was unearthed recently at Ostia.

A committee of 120 scientists has been working on a dictionary of electrical engineering terms, which it is hoped will eliminate the confusion of conflicting definitions.

Ice when pure and clear is more transparent than water.

Experimental plantings of pecan trees in Arizona are reported to be thriving.

There is more ultraviolet in afternoon sunshine than in morning sunshine.

Tobacco was only one of the plants smoked by American Indians; powdered willow bark was another.

There are more than 2,000,000 purebred cattle, 400,000 purebred sheep and 300,000 purebred hogs on farms and ranches in the United States.

Paper making, an ancient hand-operated industry of Foochow, China, has "gone modern" with the opening of a mechanically equipped paper mill there.

Some archaeologists believe that living Pima and Papago Indians of Arizona are direct descendants of the prehistoric builders of the Casa Grande pueblo ruin.

WITH THE SCIENCES THIS WEEK

Curiosity arousing questions for the teacher and general reader. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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Is adolescence a revolutionary period of life? p. 289.

STANDARDS

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ZOOLOGY

How many species of wild goat are in North America? p. 298.

GENERAL SCIENCE

Science Internationalism Aided By "Scientific Immigrants"

Professors Einstein and Ladenburg Come to Princeton To Augment Large Group of Foreign Scientists Here

SCIENTISTS are more nearly true internationalists than any other class of workers, not even excepting dancers and musicians whose arts, like mathematics, escape the barriers of language.

The recurring visits of Prof. Albert Einstein to America and his imminent addition to the staff of the unique Institute for Advanced Study established at Princeton are merely material evidences of the increasing importance of American scientific work.

While American institutions have stepped into the lead in many branches of science, particularly astronomy and biology, science in this country has not ceased to call eminent leaders from other countries to become scientific immigrants and make America their home.

Although Prof. Einstein will still consider Berlin his home, he will be an American worker in science in a practical sense when he begins to spend the academic years at Princeton next fall. With him will come his associate, Dr. Walter Mayer, of Berlin.

To Princeton there came this fall another scientific immigrant, Prof. Rudolf Ladenburg, distinguished German physicist, formerly at the Kaiser Wilhelm Institut in Berlin. He is Cyrus Fogg Brackett professor of physics of Princeton University and atomic research will benefit from his projected researches on high voltage electric energy and the development of a liquid hydrogen laboratory that will give special attention to the structure of solids.

To Baltimore from Leipzig there has come Dr. Henry E. Sigerist to head the Johns Hopkins University Institute of the History of Medicine, succeeding Dr. William H. Welch, "dean of American medicine" who founded it and has retired as director.

Dr. Walter Baade, German astronomer, is aiding in the important workings of the universe's depths being conducted at Mt. Wilson Observatory, Pasadena, Calif., while Dr. Beno Gutenberg of the famous Frankfurt school of geophysical studies last year joined the

Seismological Laboratory at Pasadena.

Such intellectual immigrants are welcomed by their American colleagues. They will be absorbed into American life. Eventually as world economic conditions improve America may be expected to add to its present quota of intellectual exports, scientific emigrants who will repay our favorable intellectual trade balance.

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ZOOLOGY

Field Museum Visitors See Bit of Abyssinia

See Front Cover

VISITORS to Chicago can make an effortless side-trip to the wilds of Abyssinia by walking down the Carl Akeley Memorial Hall of African Animals in the Museum of Natural History. At the end, a remarkable new group of African mammals has been arranged so as to give a most naturalistic illusion of a vista across a water-hole where the beasts meet in a truce imposed by the common foe of all life—thirst.

In a space as big as the proscenium arch of an ordinary theater, with background skillfully portraying the endless African plain dotted with acacias, mimosas and other characteristic trees, are set giraffes, two-horned rhinoceroses, elands, gazelles, zebras and an oryx.

The cover illustration shows the giraffe group.

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STANDARDS

Industrial Inch Loses Two Millionths of Length

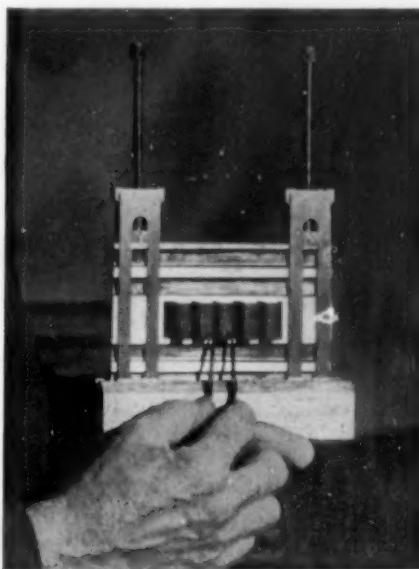
THE INCH has lost two millionths of its former length.

Though the shrinkage is not legal, industry of this country at a meeting of its representatives with the American Standards Association in New York, N. Y., decided to use a new ratio between the American inch and the millimeter in order that the precise measur-

ing of both England and the United States be done on the same basis. Their new definition says that the inch is exactly 25.4 millimeters long instead of 25.40005 millimeters. This is a difference of about one-eighth of an inch in a mile.

Adoption of the new ratio is the second and last step necessary to put precision measuring of industry of England and the United States on the same basis, H. W. Pearce, co-chief of the Division of Weights and Measures of the U. S. Bureau of Standards, told Science Service. The first and most important step was taken by England, he said, when that country's industrial representatives decided to use 68 degrees Fahrenheit as the standard reference temperature for dimensions. Their standard to which corrections for expansion and contraction had been made was 62 degrees, while engineers in the United States used 68 degrees.

"These changes were necessary," Mr. Pearce explained, "because manufacturers of precision gage blocks are attaining an accuracy of one or two millionths of an inch per inch of length, while manufacturers of precision limit gages are regularly working to an accuracy of a few hundred-thousandths of an inch. Obviously in work of this character, uncertainty or indefiniteness to the extent of the difference between the



CASTLE OF ACCURACY

This is the kind of apparatus that prompted engineers to change the definition of one common unit in terms of another. It measures a difference in the length of metal blocks of two millionths of an inch, past the accuracy of the old ratio between the American inch and the millimeter.

U. S. inch and the British inch (about one part in 363,000) could not be tolerated. The U. S. Bureau of Standards and the National Physical Laboratory at Teddington, England, will certify industrial gages on the new basis."

Mr. Pearce explained that some engineers will probably describe the changes as the setting up of a new industrial millimeter rather than the actual changing of the length of the inch. The millimeter now widely used, a unit of the metric system, is defined by a platinum bar at the International Bureau of Weights and Measures near Paris.

Science News Letter, November 5, 1932

PHYSICS

Roosevelt Medal Presented To Dr. Robert A. Millikan

DR. ROBERT A. MILLIKAN was presented the Roosevelt medal, one of a series of awards established in 1923 by the Roosevelt Memorial Association.

Dr. Millikan, director of the Norman Bridge Laboratory of Physics and chairman of the executive council of California Institute of Technology, has become widely known because of achievements in physical research and has been given many degrees and awards, including the Nobel prize for physics in 1923. Outstanding among his accomplishments are the measuring of the charge on the electron and the study of cosmic radiation which he is pursuing now.

Science News Letter, November 5, 1932

EXPLORATION

British to Attack Mt. Everest From Ground and Air

DOUBLE ATTACK on the lofty summit of Mt. Everest, from the air and from the ground, will be made by British explorers, according to plans.

Success in arranging the climb up the famous mountain is reported to British geographers in the *Geographical Journal*. The expedition will be led by Hugh Rutledge, a retired deputy commissioner of the Indian Civil Service, who has made a name as an explorer in the mountains of Asia, and who has the additional personal advantage of standing high in esteem of both Buddhists and Hindus.

The Mount Everest Committee received permission from the Dalai Lama to attempt the climb, only after over-

PSYCHOLOGY

Original Greek Read to Infant In Lengthy Test of Memory

DOES the year-old infant remember what is said to him?

Evidence that he does to some extent was found in an experiment conducted by Dr. Harold E. Burtt, of Ohio State University. According to what Dr. Burtt found, the sentimental mother who converses at length with her baby may be doing so with more effect than more practical outsiders are inclined to think.

Nonsense was not used by Dr. Burtt in his experiment, but he did use what he says was equivalent to nonsense to the baby—passages from Sophocles' "Oedipus Tyrannus" in the original Greek. Three passages consisting of 20 lines each were read to the baby daily from the time he was 15 months old until he was 18 months. Then new passages were used for three months, and the procedure continued until the baby was three years old, new passages being selected each three months and the former ones dropped. Then the whole matter was allowed to rest until the boy was eight and a half years old when he was required to learn these and other passages.

The boy was not told which were the

new passages. Yet he learned those that had been repeated to him in fewer trials than he required to master the new material. For example, he required 382 trials to learn the passage he heard when 15 months old and 226 for the lines repeated to him at 30 months, but an average of 435 trials for the new material.

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METEOROLOGY

Stratosphere Weather to Be Reported by Radio

TWO OUTPOSTS of North America's Polar Year will obtain scientific data from the upper air by radio. They are Canada's farthest north station at Coppermine on the Arctic Ocean and the College-Fairbanks station in Alaska, established by the United States Government and cooperating scientific agencies.

Thirteen automatic radio transmitters, operated by temperature and pressure indicators and fastened to a balloon, have been obtained for each station from the international Polar Year Commission. The North American stations will send their instruments up once a month, at the same time similar equipment is released in Europe and Siberia.

This apparatus, known as the radio meteorograph, was designed by the Russian meteorologist Moltchanoff. The instruments will probably be lost in the Arctic wilderness, but radio signals giving temperature and pressure will be sent back continuously from the time they leave the scientists until they are higher than Prof. Auguste Piccard ascended in his aluminum sphere.

The complete meteorograph weighs slightly more than three pounds, and nearly half of this weight is concentrated in the battery. Electrical contacts controlled by sensitive temperature and pressure elements operate the variable signals.

The College-Fairbanks station is one of the most important in the chain of scientific outposts now girding the Arctic for the second great Polar Year. Some of the agencies which have made possible its establishment are the Department of Terrestrial Magnetism of the

coming strong feeling on the part of Tibetans. Accidents that have befallen previous expeditions impress religious people of Tibet with the feeling that the gods who live in high places resent invasion of their holy retreats.

The difficult enterprise of flying over the top of the same 29,000-foot peak is planned by another British expedition, of which Lord Clydesdale is chief pilot. Describing the problems, he stated that fifty miles of the flight is over impossible country, in which sole reliance must be placed on the engine.

The only original flight now really worth while is over Mt. Everest, he pointed out.

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SOCIAL HYGIENE

How to Have a Good Time Is Adolescents' Chief Worry

Health Authorities Also Hear Returning Physicians Say Best Nourished Children of Europe Are in Soviet Union

THE CHIEF problem worrying most adolescents is how to have a good time. Boys and girls of the teen age are not interested in what their parents and teachers consider the big problems of adolescence, Prof. Maurice A. Bigelow, director of the School of Practical Arts, Columbia University, told members of the American Social Hygiene Association at a conference in Washington.

Long study of high school and college students has convinced Prof. Bigelow that adolescence is not a great cataclysm nor a revolutionary period. He said that 985 out of 1,000 boys and girls grow into, through and out of this period as naturally as they breathe. The so-called high school problems which worry parents and teachers, such as too much introspection and day-dreaming, may be found beginning as early as the eighth or ninth year. The only uniform characteristic of adolescence is the natural awakening of the sex instinct and of social interests. All other alleged characteristics of adolescence complained of by parents and teachers may be found earlier and later in the individual's life and are individual characteristics.

The three big problems which Prof. Bigelow found most adolescents concerned over are how to enjoy themselves, how to get enough money for necessities and luxuries, and how to get ahead in their study or work. He found that most boys between 15 and 19 years think of what they are going to do when they grow up, what trade or profession they will follow. Also, nearly all of them occasionally think of the time when they will be grown up and have wives and children.

Few Feel Cares

Only the very rare boy or girl feels the "cares of the world on his shoulders." Few of them are even worried about their own families.

Most parents think disobedience is the biggest problem of adolescence. They forget how complex the world

has become, and that they are asking the young people to live according to very complex standards which the young people themselves cannot understand or find reasonable. Parents would find they had the same problem if they tried to make people between 30 and 40 years conform to a standard they did not find reasonable. Prohibition, for example, is a post-adolescent problem, in Prof. Bigelow's opinion.

Russia's Children Best Nourished

The best nourished children in all Europe are to be found in Russia, in the opinion of a group of physicians who have just visited the various countries, studying health conditions. Dr. John Sundwall, professor of public health and hygiene at the University of Michigan, attributes the splendid health condition which he observed in Russian children to health-promoting activities of the government.

"I don't know any country in which the government has more interest in watching the health of the individual right through his life," Dr. Sundwall said at the American Public Health Association meeting in Washington.

More important than the economic and industrial undertakings of the five year plan is what Dr. Sundwall termed the "spiritual side" of the plan. This takes in such factors as health, education, hospitals, medical service and sickness insurance. In the cities, such as Karkov, Leningrad and Moscow, each industry has its health centers, while the public schools have their own medical service.

The future belongs to the country that produces the greatest number of children and sees that they grow up normal and free from physical defects. Russia is putting that maxim into practice, and Dr. Sundwall foresees a great future for the country. Even the over-crowding, which exists in the cities at present, shows the growth and as such is an indication of the health of the country, he said.

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STRATOSPHERE WEATHER STATION

This is the apparatus that rises into the stratosphere sending temperature and pressure information back to earth by radio. L. T. Samuels, assistant chief of the U. S. Weather Bureau, is shown examining the meteorograph and the balloon and parachute that go up with it. When in use, the meteorograph and parachute are suspended about 75 feet below the balloon, and the balloon is blown up much larger than it is in the picture.

Carnegie Institution of Washington, Alaska Agricultural College and School of Mines, U. S. Naval Research Laboratory, U. S. Weather Bureau, U. S. Bureau of Standards, Signal Corps of the War Department and U. S. Coast and Geodetic Survey, which has administrative charge of the expedition.

The Meteorological Service of Canada considers the Coppermine station an important post because it is in the path of winds from the Arctic, which influence the climate of North America.

The Alaska Agricultural College and School of Mines has been issuing an aurora report through Science Service.

Science News Letter, November 5, 1932

ASTRONOMY

Will the Great Shower Return?

A Leading Meteor Authority is Hopeful And Gives Instructions for Observing the November Shooting Stars

By DR. CHARLES P. OLIVIER

Professor of Astronomy and Director, Flower Observatory of University of Pennsylvania and President, American Meteor Society.

THE YEAR 1932 promises to be long remembered by all persons interested in astronomy. Already there has been a total eclipse of the sun which was witnessed by multitudes, although tens of thousands of others who traveled to the path of totality were disappointed by cloudy weather. There is, however, a second event scheduled, which, if it comes up to expectations, may be neither less interesting nor less awe-inspiring than the total solar eclipse. It has the added advantage that it should last for hours rather than for only 90 seconds. We refer of course to the return of the Leonid meteors which is predicted for the period from November fourteenth to eighteenth inclusive, with the best chances for the night of Tuesday, November 15, or rather after midnight, on the morning of November 16.

It would be entirely unjust to everyone, however, not to be very frank about one point. As to eclipses of the sun, there is absolutely no doubt of the day, hour,—even the approximate second can be computed for each phase. Such predictions do not fail; they never can or will. Eclipses depend upon the positions of the sun and moon, both of which have been observed daily for centuries. But with meteor showers the case is different. The very fact that a meteor, popularly a "shooting star," is seen means that that particular body is destroyed forever; it has entered our atmosphere and has been burned up; it cannot come back. Hence all our calculations are based upon past experience. As to this shower, we further assume that those meteors in the stream which are going to strike our earth's atmosphere in the future will be sufficiently numerous, at each 33-year return, to give spectacular displays as they have in the past. Also we cannot follow the meteor stream with the telescope, for its particles are too small and too far apart. Further,

we are dealing not with a single large body like a planet, but with a loose aggregation of small particles whose very existence we merely infer. Nevertheless, having given all this warning, we feel reasonably confident that this November will witness another notable meteor shower furnished by the Leonid stream, and we have good reasons for this belief.

Shower Records Since 902 A.D.

In ancient and medieval records we find numerous accounts of great showers of shooting stars. An American astronomer, H. A. Newton of Yale, about seventy years ago gathered up such records as he could find—many more have since been discovered—and found that from the year 902 A. D. brilliant showers had been recurring at about 33-year intervals, and on dates corresponding to the middle of November, that is when certain corrections had been made in the calculations of these dates. Knowing that a great display had appeared in 1833, he confidently predicted one for 1866, which indeed occurred, and was followed by lesser ones in 1867 and 1868. Future showers were then to be expected about 1899 and 1932, of which more will be said shortly.

Turning back to older accounts, we have them from China, Japan, India, North Africa under the Saracens, Rus-

sia, and many countries of western and southern Europe. With the eighteenth century America can be added to our sources of information. One or two of the older accounts may be quoted to show clearly what effect these spectacles had upon people of that day, though their descriptions are scarcely what we would now consider scientific.

The first, from the Arabic, refers to the shower of 1202 A.D., the dates in the narrative being in the old Mohammedan reckoning:

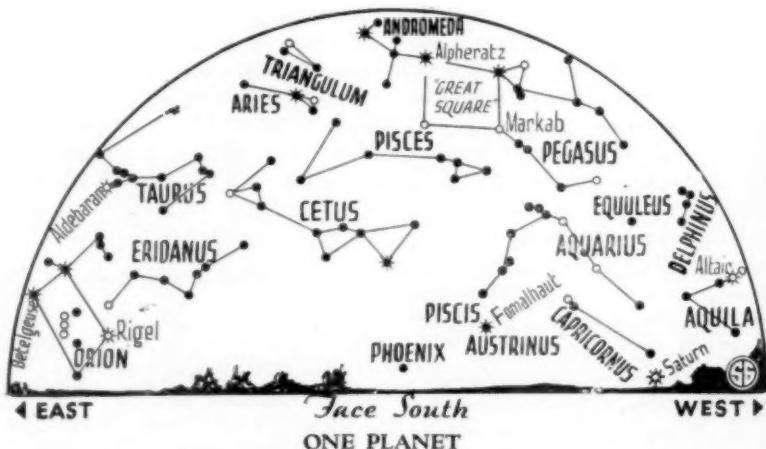
"And in the year 599, on the night of Saturday, on the last day of Muharram, stars shot hither and thither in the heavens, eastward and westward, and flew one against another, like a scattering swarm of locusts, to the right and left; this phenomenon lasted until daybreak; people were thrown into consternation, and cried to God most high with confused clamor; the like of it never happened except in the year of the Mission of the Prophet, and in the year 241."

The following brief account of the shower of 1533 comes from the Korean:

"...from the fourth to the fifth watch [2 to 4 A. M.] in the four parts of the heavens, there were innumerable shooting stars, great and small, moving together in straight and oblique lines. This continued until daylight."

Several Japanese records say that, following certain showers of meteors which were visible there, the emperor proclaimed general amnesty to prisoners, so these phenomena brought happiness to some persons at least, even though they too doubtless were equally terrified while "the stars" were falling.

Coming up to more recent times—



If the lights are few, the horizon low and the sky clear you may be able to see the ringed planet Saturn just above the tree tops in the west.

the shower of 1766 was seen in South America, and that of 1799 was the first described in semi-scientific language, by the great explorer Humboldt. We will quote the far shorter and less well-known account of our own countryman, Andrew Ellicott, then at sea:

"... about three o'clock a. m. I was called up to see the shooting of the stars. . . . The phenomenon was grand and awful, the whole heavens appeared as if illuminated by skyrockets, which disappeared only by the light of the sun after daybreak. The meteors which appeared at any one instant as numerous as the stars, flew in all possible directions, except from the earth to which they all inclined more or less; and some of them descended perpendicularly over the vessel we were in, so that I was in constant expectation of their falling among us. . . ."

"Nights the Stars Fell"

This shower was followed by a fine one in 1832, which for some reason had little publicity, and then the greater one on the morning of November 13, 1833, which has gone down in literature and folk-lore as "the night on which the stars fell." This display was generally visible over North America; Europe missed it by having the sun rise some hours sooner. We have accounts from the then-inhabited parts of the United States, and also from many ships at sea. It has been described so often that we need give only a few facts. Competent observers estimated that from midnight to dawn a quarter of a million meteors were visible from one place. Many were large and bright, leaving fine and long-enduring trains. Their numbers were likened to snowflakes in a snowstorm, and the display made a lasting impression on those who saw it. Naturally the ignorant, white and black, thought the Day of Judgment had come, and the night was one of untold terror to such persons, for they were sure that the end of the world was at hand. Fortunately, however, the phenomenon was also viewed by numerous men who appreciated its true nature and made observations that laid the basis of meteoric astronomy. The fundamental discovery was that the paths of the meteors seemed to radiate out from a point in the constellation Leo; hence the name Leonid.

The 1866 shower, while fine, was not comparable to that in 1833. The shower missed the earth entirely in 1899, though moderate numbers of Leonids were seen in 1898 and 1901. This failure in 1899 was a great disappointment, even though the probability that the meteor stream would (Turn to Page 297)

ASTRONOMY

Bright Stars Plentiful in the November Evening Skies

By JAMES STOKLEY

WHILE meteors are awaited in the open this month, astronomers in big observatories will be hunting for Tempel's comet. This object has exactly the same orbit as the path of the meteors and is supposed to be the source of the debris which are the meteors. It was last seen in 1866 and was found to return every 33 years.

But in 1899 it was missed, just as were the meteors. It may be found again.

Dr. A. C. D. Crommelin, a leading British authority on cometary orbits, says that when Tempel's comet crosses the plane of the earth's orbit, it will be about half a million miles nearer than it was in 1899 and a little nearer than in 1866. "There are thus," he stated, "good grounds for hope that the failure of the shower in 1899 will not be repeated."

The stars during these November evenings are beginning to assume a winter aspect. The "Great Square in Pegasus," one of whose corners is really in the adjacent constellation of Andromeda, is high in the southwest. Directly west and near the horizon is Altair in Aquila. To the north in Lyra is Vega, and above that is Cygnus with bright Deneb. This group is sometimes called the northern cross and is now vertical with Deneb at the top.

Fomalhaut can be seen low in the

southwest in Piscis Austrinus, the southern fish. Over in the east can be seen the three stars that form the belt of Orion, close to the horizon and in a vertical row. To their right is Rigel, in the same constellation and to their left is Betelgeuse. Above Orion is Taurus, with the red Aldebaran as its brightest star. To the left of Taurus is Auriga, in which is the first magnitude Capella. Thus, eight first magnitude stars can now be seen in the evening sky.

During November the moon is at first quarter on the fifth. On the thirteenth it is full, on the twenty-first at last quarter, and on the twenty-seventh it is new. Thus, during practically the entire first half of the month, the evenings will be moonlit.

On November 5, the moon occults, or passes in front of a star of the 2.9 magnitude, known as delta Capricorni. This will be visible from Washington, and can be seen with a small telescope or possibly with the naked eye, though it is rather hard to see a star of this brightness when so close to the bright moon. At Washington, in local time, it will pass behind the bright edge of the moon at 8:41 p. m. At 9:45 p. m. it will emerge from in back of the dark lunar limb. When such an occultation occurs, the star disappears and emerges instantaneously, for there is no lunar atmosphere to cause a gradual diminution in brightness.

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This map pictures the skies as they appear in the early evening. In the morning hours of days in mid-November, the constellation of Leo will occupy Gemini's position. The Leonid meteors will appear to radiate from a point in the "Sickle" of Leo.

PALEONTOLOGY

Earliest Cat Found Among Badlands Fossils

POSSIBLY the original ancestor of all the later saber-tooth tigers, certainly the earliest cat so far found, is the distinction claimed by one of the fossil skulls brought back to Princeton University from the Big Badlands of South Dakota by Prof. Glenn L. Jepsen, leader of the Scott Fund Expedition.

The fossil was included among hundreds of others dug up in the Big Badlands during the past summer. It was recognized then as a saber-tooth tiger, but its unique position in the feline family tree was not then determined. Now it has been found to be a new genus, ancestral to two separate lines of saber-tooth tigers for which no connecting link has hitherto been known.

Its position in a lower geological stratum than any in which feline fossils have ever before been found definitely marks it as the earliest known cat. The formation in which it was found is of early oligocene age, of an antiquity estimated at some eight or nine million years.

In the opinion of the late Prof. W. D. Matthew of the University of California, all modern members of the cat family descended from the saber-tooth tiger tribe. Certain it is that the saber-tooth beasts are geologically older, so far as all present evidence goes. If this theory of feline evolution is true, then Princeton University is now the resting-place of the most ancient ancestor of all cats.

Science News Letter, November 5, 1932

METEOROLOGY

Subnormal Rainfall Indicated for California

CALIFORNIA will have a slightly drier-than-average winter this year, according to climatic-trend data compiled by Drs. George F. McEwen and A. F. Gorton of the Scripps Institution of Oceanography.

"In general, the available evidence points to considerably less precipitation than last season, but not far from the average," Dr. McEwen said. "Fewer general storms and less snowfall in the higher altitudes may be expected. The runoff of important northern watersheds is estimated to be from 70 per cent. to 90 per cent. of the normal."

"The trend of both precipitation and

runoff in the northern area is still downward, contrary to indication for Southern California, but the reversal of the temperature trend last winter may have marked the end of the dry period in the north, and may mean a rapid rise during the next decade."

Drs. McEwen and Gorton base their calculations on observed relationship between the temperature of the ocean water, the annual precipitation over a considerable period of years, and sunspot numbers. The composite index thus obtained has scored a 75 to 80 per cent. success; the reliability is apparently greater when a deficiency in rainfall is indicated.

With deficient rainfall there comes also a general decrease in temperature. Since last November the trend of temperature throughout California has been downward. Although milder weather is expected than was experienced last winter, the prospect is for a continuation of subnormal temperatures during the next few years, the two oceanographers stated.

Science News Letter, November 5, 1932

BACTERIOLOGY

Better Sauerkraut From Washed Cabbages

WASH your cabbages before you shred them if you want the best sauerkraut.

This is the moral to be derived from experiments at the University of Wisconsin by a scientific team headed by C. H. Keipper. Tests of the finished product, in hundreds of barrels, by connoisseurs of kraut indicated the product of the washed cabbage-head a winner every time.

Shredded cabbage, salted down, becomes sauerkraut through natural fermentation, caused by microorganisms present on the cabbages as they are brought in from the field. These are principally lactic acid bacilli, the germs that cause milk to sour. But in the field dirt that clings to the heads as they are brought in there are millions of other germs, which are not so good for the kraut. They give it off flavors and odors, and may spoil it entirely. If the dirt, and these unfriendly germs with it, is washed off, there still are plenty of the right kind of bacteria in the inner leaves to start the proper fermentation.

The natural bacteria can be relied on, the tests indicated. Pure cultures of lactic acid bacteria gave a little better results.

Science News Letter, November 5, 1932



ASTRONOMY

Nine Groups Organize To Watch November Meteors

NINE GROUPS of observing parties including astronomers at five observatories, will join in watching for shooting stars on three nights in the middle of November.

Scattered at points from Philadelphia to Virginia, these scientists have been organized by Dr. Charles P. Olivier, director of the Flower Observatory of the University of Pennsylvania, and president of the American Meteor Society. The Naval Observatory and the Georgetown University Observatory at Washington; the Hood College Observatory at Frederick, Md.; the observatory of the Maryland Academy of Sciences at Baltimore, as well as the Flower Observatory, are in the "hook-up."

In this way, it is hoped to get an accurate record of the numbers of meteors that appear in the Leonid shower of shooting stars. Every year some of these meteors appear, but astronomers think it likely that this year may see a display that has not been equalled since 1866. The night of Nov. 15 and early morning of Nov. 16, it is supposed, will bring the greatest numbers, but observers will be on watch during the preceding and following nights.

Science News Letter, November 5, 1932

CHEMISTRY

Work in Rubber Technology Wins Chemistry Award

GEORGE OENSLAGER, Akron rubber chemist, is the recipient of the 1933 Perkin medal, awarded annually for the most valuable work in applied chemistry. He initiated and successfully carried into production the carbon black tread and the nitrogenous organic accelerator which are rated as two of the five major achievements that have taken place in rubber technology in the last thirty years. The date of the medal presentation by the American Section of the Society of Chemical Industry has not yet been set.

Science News Letter, November 5, 1932

EE FIELDS

PHYSIOLOGY

Nobel Prize Shared By British Physiologists

THE 1932 Nobel Prize in medicine and physiology was given Sir Charles Scott Sherrington of Oxford University and Prof. Edgar Douglas Adrian of Cambridge University for research on nerves. Sir Charles was a pioneer investigator into the reflex action of nerves when Prof. Adrian was still in the nursery. Sir Charles did a large amount of experimental work on all phases of nerve activity. He brought together knowledge of how the nerves all work together.

Prof. Adrian, who at the comparatively young age of 43 years, shares the Nobel Prize with Sir Charles, has made investigations on the nerves with the aid of very modern physical instruments. He has applied the modern amplifying methods of radio to the measurement of the current in single nerve fibers, and was the first to measure the current of such a single nerve fiber.

Science News Letter, November 5, 1932

ASTRONOMY

Partial Eclipses May Give Total Eclipse Data

ASTRONOMERS will not have so much incentive to wait years for a total eclipse of the sun or travel thousands of miles to observe it if they utilize the suggestion made by Dr. Herbert Dingle, University of London astrophysicist, who talked at the California Institute of Technology.

Dr. Dingle told how observations of value can be made during partial eclipses of the sun, which occur much more frequently than total eclipses. Heretofore astronomers have considered partial eclipses of little scientific value.

Dr. Dingle's idea is to take advantage of the two corners of the partially eclipsed sun where the moon's disc intersects that of the sun. There the conditions are just like those of totality. By training a spectroscope on such a corner and following it during the earlier part of an eclipse, it would be pos-

sible to get a long exposure of the so-called flash spectrum. This flash spectrum comes from the atmosphere of the sun. It consists of bright lines on a dark background instead of dark lines on a bright background as in the ordinary solar spectrum. The old method was to catch it as it flashed on for a few seconds just before totality. Dr. Dingle with his new method will be able to get strong exposure, twenty minutes if necessary, and this will permit a high accuracy in the measurement of the lines.

Dr. W. S. Adams, director of Mt. Wilson Observatory, commented that with the development of methods like those of Dr. Dingle it will soon be possible to get along without total eclipses except for a few special observations.

Science News Letter, November 5, 1932

ARCHAEOLOGY

Fate of Huge Indian Collection Uncertain

HOPES that science may take some record of the huge collection of Indian relics belonging to the late Edward W. Payne, before the thousands of articles are disposed of and perhaps scattered, is expressed by Dr. Warren K. Moorehead, archaeologist, of Phillips Academy at Andover, Mass.

The Payne collection is so large that no other single collector and few museums in the United States outrank it in sheer quantities of Indian objects, Dr. Moorehead said. Mr. Payne, a banker of Springfield, Illinois, pursued his hobby of digging up and purchasing Indian objects for fifty years, amassing an ever-growing array of Indian pipes, bowls, blankets, headdresses, and other articles, until they overflowed his residence, and he had to arrange storage space in rooms elsewhere. The number of boxes of such objects is estimated at 4,000.

Since Mr. Payne's death, last March, the fate of the collection has hung in the balance.

Dr. Moorehead, who knew Mr. Payne for thirty-five years, and who has examined portions of the exhibits at various times, states that many of the objects have scientific importance. The banker's tremendous interest in Indian antiquities was aroused before the great museums of the country had begun their efforts to preserve the story of Indian America. Many of the sites which are represented in the collection have long since been obliterated.

Science News Letter, November 5, 1932

BACTERIOLOGY

Vaccines May be Inefficient Because Germs Are Weaker

THE STRAIN of typhoid fever germs from which most anti-typhoid vaccines are now made may no longer be efficient in giving protection against the disease. Studies showing this were reported by Dr. Francis B. Grinnell of Harvard University to the American Public Health Association meeting in Washington.

The vaccines like those which were used so successfully to protect American soldiers during the World War, are made from what is known as the Rawlins strain of typhoid germs. The original germs of this strain, the ancestors of the ones that make the typhoid vaccine, were isolated from a soldier who died in the South African war.

Bacteriologists have found recently that germs are not very stable. They may change their form and characteristics as they grow older, and with these changes there is sometimes a change in virulence. The Rawlins strain of typhoid germs has shown some of these changes, and investigations with mice showed that the Rawlins strain was much inferior as a protective agent to some of the other strains with which they are compared.

Science News Letter, November 5, 1932

ENTOMOLOGY

Insect "Missing Link" Found in South America

THE RANKS of evolutionary "missing links" have lost another member. This time it is a fly, a curious insect from the high lying lake region of southwestern Argentina, that fills a gap between the bot-flies that bother cattle and a group of tiny flies that parasitize other insects. The common house-fly is only a distant relative.

The find was made by Raymond C. Shannon, a Smithsonian entomologist, but its significance was not realized until the specimen reached the U. S. National Museum. Here it was examined by Charles H. T. Townsend and Dr. J. M. Aldrich, Smithsonian curator of insects.

The new fly is like a bot-fly, except that it has bristles on its body, while the bot-fly is smooth. It represents, possibly, a "surviving ancestor."

Science News Letter, November 5, 1932

ASTRONOMY

The Leonids of 1833

"A Classic of Science"

A Scientific Eye-Witness Describes the Famous Shower Of Falling Stars Which Occurred Ninety-Nine Years Ago

OBSERVATIONS ON THE METEORS OF NOVEMBER 13th, 1833; by Denison Olmsted, Professor of Mathematics and Natural Philosophy in Yale College. Published in The American Journal of Science and Arts (Silliman). Vols. XXV and XXVI. New Haven: 1834. This is an exact reprint of extracts from the original publication.

ABOUT DAY BREAK this morning, our sky presented a remarkable exhibition of Fire Balls, commonly called *Shooting Stars*. The attention of the writer was first called to the phenomenon about half past five o'clock; from which time until near sun rise, the appearance of these meteors was striking and splendid, beyond any thing of the kind he has ever witnessed.

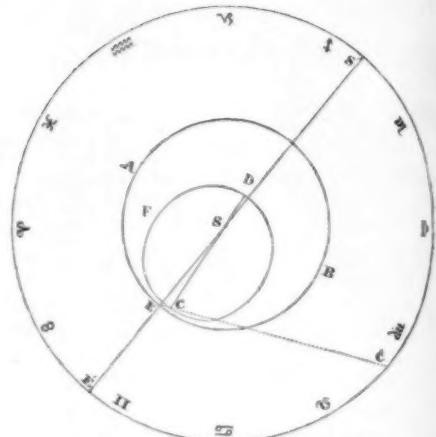
To form some idea of the phenomenon, the reader may imagine a constant succession of fire balls, resembling sky rockets, radiating in all directions from a point in the heavens, a few degrees south-east of the zenith, and following the arch of the sky towards the horizon. They commenced their progress at different distances from the radiating point, but their directions were uniformly such, that the lines they described, if produced upwards, would all have met in the same part of the heavens. Around this point, or imaginary radiant, was a circular space of several degrees, within which no meteors were observed. The balls, as they travelled down the vault, usually left after them a vivid streak of light, and just before they disappeared, exploded, or suddenly re-

solved themselves into smoke. No report or noise of any kind was observed, although we listened attentively.

Beside the foregoing distinct concretions, or individual bodies, the atmosphere exhibited *phosphoric lines*, following in the train of minute points, that shot off in the greatest abundance in a northwesterly direction. These did not so fully copy the figure of the sky, but moved in paths more nearly rectilinear, and appeared to be much nearer the spectator than the fire balls. The light of their trains also was of a paler hue, not unlike that produced by writing with a stick of phosphorus on the walls of a dark room. The number of these luminous trains increased and diminished alternately, now and then crossing the field of view like snow drifted before the wind, although in fact, their course was towards the wind.

From these two varieties, the spectator was presented with meteors of various sizes and degrees of splendor: some were mere points, but others were larger and brighter than Jupiter or Venus; and one, seen by a credible witness before the writer was called, was judged to be nearly as large as the moon. The flashes of light, although less intense than lightning, were so bright as to awaken people in their beds. One ball that shot off in the northwest direction, and exploded a little northward of the star Capella, left, just behind the place of explosion, a phosphorescent train of peculiar beauty. This line was at first nearly straight, but it shortly began to contract in length, to dilate in breadth, and to assume the figure of a serpent drawing itself up, until it appeared like a small luminous cloud of vapor. This cloud was borne eastward, (by the wind, as was supposed, which was blowing gently in that direction) opposite to the direction in which the meteor had proceeded, remaining in sight several minutes. The light of the meteors was usually white, but was oc-

Prof. Olmsted wrote out for the New Haven *Herald* the account which forms the first part of this "Classic." He added an appeal for descriptions of the meteors as seen from other localities. His article was widely copied into other papers, and he received a large number of replies from scientists and amateurs. Many, like his own, were accounts which they had written for their local papers on the day of the display. From these records, Prof. Olmsted got important data bearing upon his theory that the meteors describe a path like a comet's around the sun.



ORBIT OF THE LEONIDS

Prof. Olmsted's diagram showing the plane of the ecliptic and the hypothetical orbit of the meteor swarm in relation to the orbit of the earth

casionally prismatic with a predominance of blue.

A quarter before six o'clock, it appeared to the company that the point of apparent radiation was moving eastward from the zenith, when it occurred to the writer to mark its place, accurately, among the fixed stars. The point was then seen to be in the constellation Leo, within the bend of the sickle, a little to the westward of Gamma Leonis. During the hour following, the radiating point remained stationary in the same part of Leo, although the constellation in the mean time, by the diurnal revolution, moved westward to the meridian nearly 15 degrees. By referring to a celestial globe, it will be seen that this point has a right ascension of 150 degrees, and a declination of about 21 degrees. Consequently, it was, when on the meridian, 20 degrees 18 minutes south of the zenith.

The weather had sustained a recent change. On the evening of the 11th, a very copious southerly rain fell, and on the 12th, a high westerly wind prevailed, by gusts. Last evening the sky was very serene; a few "falling stars" were observed, but they were not so numerous as to excite particular attention.

The writings of Humboldt contain a description of a similar appearance observed by Bonpland at Cumana, in 1799. It is worthy of remark, that this phenomenon was seen nearly at the same hours of the morning, and on the 12th of November.

[Phenomena as observed at New Haven, (Lat. 41° 18' N., Lon. 72° 58' W.) and published in the New Haven *Daily Herald*, Nov. 13, 1833. The substance of this sketch is the same as that published in the New Haven *Herald*, on the day of the occurrence; but as that sketch was drawn up in haste, careful reflection has since suggested a few additions and alterations of phraseology, with a view of rendering the statement more explicit.—DENISON OLMS.]

The Meteors and the Earth

We have seen that the meteors appeared to be analogous, in their constitution, to the material of which the nebulous matter of comets is composed, in all the particulars in which we can compare the two. We may be permitted, therefore, in order to avoid circumlocution, to call the body which afforded the meteoric shower, a comet, while we pursue the inquiry, whether it exhibited the other attributes of that class of bodies.

The leading circumstances to be accounted for are the following: Why the phenomenon remained so long stationary with respect to the earth? Why it was seen in that particular part of the heavens? Why it returns at stated periods, having appeared at Mocha, in Arabia, just one year preceding, and, in a manner very similar to the present, as described by Humboldt, and by Ellicott, thirty-four years before?

Let the figure represent the plane of the ecliptic, with the twelve signs, AEB the earth's orbit, S the sun, and E the earth. On the morning of Nov. 13th, the place of the sun was in $21\frac{1}{4}^{\circ}$ of Scorpio, and that of the comet in $23\frac{3}{4}^{\circ}$ of Leo, (as observed at New Haven) being distant from the sun within $2\frac{1}{2}^{\circ}$ of three signs or 90 degrees. The line of direction, therefore, as seen from the earth, was very nearly a tangent to the earth's orbit, and consequently coincided nearly with the line of direction in which the earth itself was moving. In other words, the earth was moving almost directly towards the comet. Therefore, S' being the place of the sun among the signs, E' that of the earth and C' that of the comet, join EC', and the comet's place will be in the line EC', and, as was before shown, very near to E. Let it be at C.

Now the comet remained apparently at rest, and of course near the line EC' for at least two hours. This it could not

have done, unless it had been moving in nearly the same direction as the earth, and with nearly the same angular velocity around the sun. For had it been at rest, the earth, moving at the rate of 19 miles per second, would have overtaken it in less than two minutes; or had it been moving in the opposite direction, the meeting would have occurred in still less time; or had not the angular velocities of the two bodies been nearly equal, they could not have remained so long stationary with respect to each other. Hence we conclude, (1.) that the body was pursuing its way along with the earth around the sun.

Taking it for granted that the orbit of the body is elliptical, like the orbits of all the other bodies of the system, we infer that, at the time of observation, it must have been either at its perihelion, or its aphelion, otherwise its angular velocity could not have corresponded so nearly to that of the earth. The regular return of the phenomenon, at short periods, indicates that the aphelion, and not the perihelion, is near the orbit of the earth. Another reason will be stated hereafter, which, it is supposed, confirms this conclusion. As the body was very near the earth at the time of observation, it must have been at its aphelion; and being seen then, only $7\frac{1}{4}^{\circ}$ from the ecliptic, the plane of its orbit must be inclined at a small angle to the plane of the ecliptic, so that the body itself, if seen at all, will be seen within the zodiac. From all these considerations we conclude, (2.) that the body revolves around the sun in an elliptical orbit, but little inclined to the plane of the ecliptic, and having its aphelion near to the orbit of the earth.

Let us inquire, next, what is the periodical time? Since the same phenomenon was exhibited at Mocha, on the morning of the 13th November, 1832, and on a much larger scale than that, in various parts of the world, on the morning of the 12th November, 1799, we cannot suppose such a coincidence in the time of the year to have been purely accidental, but must conclude that the periodical time of the comet, and that of the earth, bear to each other a ratio which can be expressed in whole numbers; so that after a certain number of revolutions of the two bodies, corresponding to the terms that express their ratio, they will come together again. They could not come together, as they did, on two successive years, unless the periodical time of the comet was nearly an aliquot part of that of the

earth, such as one half, one third, &c. Now, if the time be any aliquot part of a year, it must be one half, so that the comet would perform two revolutions, while the earth performs one; for, were its period only one third of a year, the line of the apses would not be long enough to reach the earth. This will be obvious from the following estimate. Let D represent the axis major of the earth, and d that of the comet's orbit, their times being as 3 to 1. Then, by Kepler's Law, $3^2 : 1^2 :: D^3 : d^3$.

Taking D = 190,000,000 miles, d = 91,343,000 for the whole major axis, which is not equal to the distance from the sun to the earth. But, supposing the times as 2 to 1, we have

$2^2 : 1^2 :: D^3 : d^3$, whence $d = 119,692,000$ miles; giving for the perihelion distance 24,692,000, and for the aphelion 95,000,000 miles. Hence we conclude, (3.) that the body has a period of nearly six months, and its perihelion a little below the orbit of Mercury.

The transverse axis and the foci being determined, the ellipse may be described. Therefore, join CS, and produce the line CS and D, making SD equal to the perihelion distance, and upon CD describe the ellipse CFD, and it will represent the orbit of the comet.

This is to be regarded only as a first approximation to the true periodic time. The distance from the sun, instead of being taken, as here, at the extremity of the body, ought to be reckoned from the center of gravity, if we knew where to fix that. Nor can we suppose that the periodical time is very uniform, since a light nebulous body like the one in question, crossing as it does the orbits of Venus and Mercury, and having its perihelion near the orbit of the latter, would be subject to very great perturbations, sufficient to alter the dimensions of its orbit at every revolution. It might, for example, by coming into near conjunction with Mercury, have its periodic time greatly shortened, and be com-

How do we know when the thermometer is right?

LORD KELVIN

tells how he constructed the
Absolute Thermometric Scale in
THE NEXT CLASSIC OF SCIENCE

elled, for a long period, to revolve nearer to that planet than it does at present; and again by coming into a similar position with respect to the Earth, its orbit might be enlarged, and its periodic time increased, so that it might for a long period revolve nearer to the earth than before. I am not able at present to assign the amount of these disturbing forces, but it is easy to see that they exist, and must greatly influence the motions of the body.

The reader will very naturally suppose that, if a comet had approached so near to the earth, having the plane of its orbit in the zodiac, it would have been visible, first on one side of the sun, and then on the other, like an inferior planet. There are grounds for believing that such is the fact, and that a body answering to the conditions of the supposed comet, has been seen, at intervals, ever since the 13th of November, and is still (March 31st) visible in the west after sunset. . . .

1. Such a luminous appearance was exhibited on the morning of November 13th, being seen in the east before the dawn of day. . . .

2. A peculiar light was seen eastward of the sun, visible in the west after sunset, as early as the first of December. . . .

From our theory we should farther anticipate, that the comet will disappear by or before the first of May, being too near the sun to be visible; and that after the month of May, if seen at all, it will appear on the western side of the sun and rise before him, until the month of August, when it may possibly reappear.

V The Science Service radio address next week will be on the subject,

NOVEMBER METEORS

by

D Dr. Charles P. Olivier

A Director of the Flower Observatory of the University of Pennsylvania and president of the American Meteor Society.

I FRIDAY NOV. 11

D at 12:45 P. M., Eastern Standard Time

O Over Stations of The Columbia Broadcasting System



pear for a little while in the evening sky.

Should future observations conspire with those already made, to establish such a period to this remarkable light, it will probably be regarded as a cometary body, and as the source of the meteors of Nov. 13th. But it will be remarked, that the several arguments alleged to prove the connexion of that phenomenon with a comet, are entirely independent of this light.

From all the foregoing considerations, I feel authorized finally to conclude, *That the Meteors of Nov. 13th, consisted of portions of the extreme parts of a nebulous body, which revolves*

CHEMISTRY

Octane Rating of Gasoline Not Wholly Dependable

THE MUCH-ADVERTISED "octane rating" of gasoline is not wholly dependable in selection of automobile fuel, according to Dr. Arthur Lachman, petroleum research chemist.

Since motor-car manufacturers have taken to building high-compression engines, old-fashioned straight-distilled gasoline is just not so good. Such fuel was made by simple methods much like the old process of turning out moonshine whisky. It was about the only kind of "gas" the public knew ten years ago.

A new test fuel, known commercially under the inexact name of iso-octane, and designated more precisely by chemists as 2,2,4 trimethyl pentane, has been chosen as an ideal standard of anti-knock performance. It would be wonderful if it did not cost \$20.00 per gallon. The new commercial gasolines of premium and standard grades are being treated chemically so as to give a relatively high "octane number," in engineering parlances. This number indicates how closely the gas approaches the figure of 100 par for trimethyl pentane.

Dr. Lachman points out that a gasoline which has passed the anti-knock engine test with a high score does not necessarily give superior results in an engine working at a different temperature. For example, an air-cooled motor, working at high cylinder temperature, will often not recognize a high-octane gasoline as a superior fuel. On the other hand a low-temperature water-cooled motor may accept the fuel in question

around the sun in an orbit interior to that of the earth, but little inclined to the plane of the ecliptic, having its apogee near to the earth's path, and having a periodic time of 182 days, nearly.

I have supposed that a nebulous body, revolving about the sun in an eccentric orbit, might properly be called a comet, but should any one think that the analogy is not strong enough to authorise us to rank it among bodies of that class, he can apply any other name which seems more appropriate. Changing the name will not affect the validity of the theory.

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to great advantage. The moral for the consumer is simple: Try out the different brands on your own motor and make your own scientific decision.

Rumors have gained credence that "high octane" is just another form of commercial buncombe originating in the advertising departments. Critics voicing these rumors base their conclusions on the fact that the oil companies do not advertise the actual octane numbers of their several motor fuels. Dr. Lachman comes to the defense of the oil company. As long as one cannot with certainty predict from octane number just how good performance will be, just so long would it be misleading to coax a purchaser into line by quoting numbers.

Incidentally experiments show that gasoline which attains good anti-knock quality by addition of chemicals is more steady at different temperatures than gas of naturally high octane rating.

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ANTHROPOLOGY

Peking Man's Wrist Bones Found at Original Site

NEW FOSSIL remains of Peking Man, *Sinanthropus Pekingsis*, have been found at the Chou Kou Tien, China, site where the original skull was discovered in 1929. The new find consists of fossilized small bones from the wrist. They are reported to be definitely human in character.

Science News Letter, November 5, 1932

GEOGRAPHY

Explorer Finds New River In Jungle of Brazil

By OTTO W. ULRICH, leader,
Ulrich Expedition.

IN CAMP on the Rio Brown, we are preparing to follow its course, with the expectation of reaching ere long the territory of the Kulu Indians. The Rio Brown does not appear on any of the maps and atlases heretofore published and has apparently not been seen by white men prior to our coming.

As the discoverer of this river, I have taken the liberty of giving to it the name of "Rio Brown," in honor of Dr. William Moseley Brown, of Ballston, Va., under whose auspices, along with several others, the expedition is being conducted. I have already notified the Brazilian government of this action, which will undoubtedly be promptly approved.

From the Rio Brown our journey now takes us into the territory of the Kulu Indians. This is the locality where Colonel Fawcett was last heard from and where more than one attempt has been made to discover his fate. Further reports will be made on our trip into this territory and our explorations along the Rio Brown. From Pirapora, Estado de Minas, Brazil, which is the last railroad station and the "jumping off" place into the jungle, the journey was by canoes along the following rivers: Rio San Francisco, Rio Carinhanha, Rio Paran, Rio Tocantin, Rio Gurupi, Rio Araguaya and Rio Brown.

The route traversed has been somewhat different from that which we intended. In order to press forward as rapidly as possible, we depended chiefly upon the waterways. We refrained from traveling by Para (Belem), going direct from the Rio Tocantin into the Indian territory of the Gurupi River, and thus saving much time.

Indians Killed Two

The trip up to this point has been at times beset with greatest difficulties. Powerful rapids and waterfalls impeded our progress tremendously. The hostile Indians, too, caused us much distress. Two of my traveling companions (natives) were killed through enemy bow-shots.

Many wild animals, snakes, and beasts of prey crossed our path. I personally shot as many as seven jaguars, all of large size and black in color.

The trip from the Rio Tocantin to the Gurupi River was full of hardships. On the Tocantin River we were compelled to leave our canoes behind. Our outboard motor, cans of gasoline, and baggage were dispatched in forced marches to the Gurupi by native carriers. On the Gurupi we built a raft and made our way into the territory of the Urubu Indians.

Our return journey from the Rio Gurupi to the Araguaya River was just as difficult. The Indians living in this territory gave us canoes fashioned from logs, which had been hollowed out with fire, so that we could press on without delay.

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miss the earth had been predicted. What then are our present chances? In 1928 many Leonids appeared; in 1929 very few; in 1930 the numbers increased greatly; in 1931 we had a very fine display. Meantime calculations made by expert English and Russian astronomers show that the stream of particles should have been shifted back since 1899 into such a position that the earth will pass through it again, probably as well as in 1866, though not right through the densest part which we met in 1833. It

is on the basis of this information that astronomers feel hopeful that we shall see a shower of considerable brilliance.

What should you expect to see if you watch for the Leonids? A description of last year's shower should give you some indication of what we hope this year's will be. On the night of November 17, 1931, a party of eleven of us was at a country home high up in the Catskill mountains. The sky cleared beautifully about 11 o'clock, just as Leo was rising. Immediately meteors began to shoot across the sky, almost the first being a brilliant red Leonid. A total of 2,600 was counted before dawn by our group; making allowance for duplicates, at least 1,000 different meteors were seen. A very large number of these were bright, and dozens left fine trains, some of which remained visible from one to twelve minutes. Such trains, when they lasted for some minutes, changed their forms and drifted with the winds of our upper atmosphere, adding greatly to the beauty of the spectacle. The bright meteors were of various colors, and sometimes as many as four came one after the other so quickly that the observer could not make a record of the first without missing all the others. Last year there was no moonlight to interfere.

We hope, as I said, for a far better display in 1932, probably on the night of November 15-16; but the main shower may occur on the preceding or following night. Also we may have the bad luck of having the richest part come during our daylight hours, which would make it visible to either Europe, the Pacific, or Asia. These contingencies, like cloudy weather, cannot be helped. Unfortunately also, the moon will be bright this year, and its light will cut down the number of the fainter meteors seen.

(Turn Page)

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Despite these facts, the American Meteor Society is organizing a campaign to cover all parts of the country, so, if it is cloudy in some states, we will still have chances of getting good observations from our members in others. More particularly we are concentrating on the observation of those meteor trains which endure for more than a minute and show some movement or drift in the interval. Accurate drawings on star maps of the same train as seen from two distant stations will permit the calculation of its height, and, if series of drawings are made, of the wind velocities higher than any sounding balloon can penetrate—far higher than Prof. Piccard recently was able to go.

For the casual untrained observer, we ask that they make half-hour counts of all meteors seen, each person, if several are present, making his count separately and quite irrespective of his companion—in other words, counting what he sees, even if his companion also notes the same meteor. Those who know the constellations well enough should also plot the paths of very brilliant meteors and particularly of long-enduring trains left by them. For such observations, it is essential to record the time accurate-

ly, as well as the color and magnitude of the meteor.

Eleven o'clock is about as early as there is hope of seeing these meteors, and their numbers usually increase steadily up to four or five o'clock in the morning.

In closing, let me once more assure my hearers that if the Leonids return even as well as in 1866 and if the sky is clear on the critical night, they should furnish a spectacle which will richly repay everyone who takes the trouble to watch it.

EDITOR'S NOTE: Dr. Olivier's article was written as a radio talk for delivery through the Columbia broadcasting system.

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Mercury and iodine disinfectants were the most effective for killing fungus growths similar to the one suspected of causing athlete's foot, Dr. Chester W. Emmons of the College of Physicians and Surgeons, Columbia University, New York City, found from studies which he reported to the American Public Health Association. Dr. Emmons reported the action of a number of other disinfectants, among them copper and sulphur ones, which were surprisingly ineffective on funguses he studied.



Mountain Aristocrat

SNOWSTORMS are already swirling down the canyons of the Rockies, and the tourists ride along the roads no more until next spring. Little concerns the mountain goat his shaggy head about that, however. Winter is a better time than summer, so far as he is concerned, provided only that the snow does not get so deep that he cannot get at his food. Within his thick coat of wool he is secure from the cold, and there are no insects, tourists in smelly gasoline cars, or other troublesome pests to annoy the solitude over which he reigns.

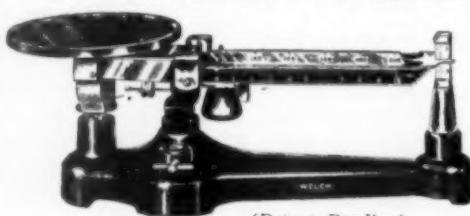
The white mountain goat is the sole American representative of the wild goat tribe, whose species are more numerous in the old world. Though he goes alone, however, he need not go ashamed. He is as fine a specimen of the animal which Solomon once ranked even with the lion as "exceeding majestic" as can be found anywhere in the world, with his high-humped, powerful shoulders and his short but beautifully polished black horns.

Our mountain goat is decidedly an animal of the North. He is common in Alaska and British Columbia, but does not get farther south in the United States proper than the region of Mount Rainier and Glacier national parks. Even there he haunts the skyline during the summer and descends into the lower valleys only when the snow fills them.

The mountain goat is a really big animal, as goats go. Walter P. Taylor of the U. S. Biological Survey, states that an average male specimen stands about three feet high at the shoulder, and is more than five feet in length.

Science News Letter, November 5, 1932

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ENGINEERING

Difference in Brightness Is Biggest Auto Light Problem

WHEN AUTOS pass in the night, there is often blinding glare in one driver's eyes. This is a major safety problem of our automotive age and the U. S. Bureau of Standards over a period of years has conducted research on headlights to discover the facts.

Dr. H. C. Dickinson, Bureau of Standards scientist who will be honored with the next presidency of the Society of Automotive Engineers, concludes that the most serious problem involved in safe headlighting is the great disparity in brightness between beams from different lamps. One headlight beam may be ten times as intense as another under even fairly normal conditions. The result is that the driver with the dim lights experiences almost complete lack of visibility when his auto plunges into the bright light of the approaching car. This is true no matter what measures are taken to reduce glare. Dr. Dickinson suggests that most of the glare problem would be solved if the brightness of lights could be kept so that no light was more than two or three times brighter than another.

Plenty of light on the side of the road is needed for a safe meeting with another car that brings with it unavoidable glare. Drivers learn to rely on what they can see of the curb or shoulder and guide by the edge of the road rather than by the oncoming car. To give this roadside illumination, the light for a hundred feet in front of the car should be increased and the beam should be wide spread horizontally and depressed somewhat below the horizontal. This is the function of switching over headlights to "dim" when another car approaches. Such a light is best also for slow speed travel on rough and very curving roads.

Few autoists realize that it is more dangerous to pass a car that is standing still than one that is running at a fair speed. No practical sort of regular headlighting will enable both approaching drivers to distinguish objects to the rear of approaching lights for more than about a hundred feet. A driver in judging whether the road is clear therefore relies on what he has seen during the past few seconds by the light of the on-

coming car. But the road immediately back of a car at rest is not illuminated in this way and danger may lurk there unseen.

For open-road driving at good speeds and no passing cars the head-lamps should be aimed horizontally with a concentrated beam spread only about 25 degrees horizontally.

Lights along streets, roads and highways at times increase the hazards of night driving and Dr. Dickinson feels that this problem should be studied. Lights scattered along the road may in some cases illuminate an obstacle so that it has no contrast with its background and is thus practically invisible. Exposed lights along the road may actually make less visible objects that would be seen easily with headlights alone.

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METALLURGY

Metallic Powders Pressed Into Light, Useful Objects

MEETALLIC powders have served in various capacities from the gold dust of the forty-niners to the aluminum powder paint that covers oil tanks to protect them and reflect the heat rays.

Now powdered metal is entering industry as the rival of molten metal in making small objects. The process is similar to that used in making some clay and porcelain products. The powder is molded into shape under intense pressure. This forms objects that have the appearance of ordinary metal, but only the squeezing of the particles and their interlocking makes the pressed powder present a solid appearance. These molded metallic sponges are then heated to a temperature not quite sufficient to melt the metal. The particles weld together and the material emerges with the advantage of light weight, from a third to four-fifths that of cast metal. After this heat treatment, the powdered metal objects can be handled as though their metamorphoses had been molten instead of powdered.

The devices that mold the powdered metal are really giant pill-making machines. The problem of supplying the correct amount of powder and apply-

ing the proper pressure had been solved on a small scale in the pill presses that roll out millions of medicine pellets daily.

The powdered metal process makes possible the use of alloys that can not be produced by casting molten metal. Like oil and water, some molten metals will not mix. Or their temperatures of melting are too divergent. An alloy of such metals can be made by mixing their powders in proper proportion.

Powder metallurgy arose out of the process of making tungsten wire for electric light filaments. The high melting point of tungsten forced the invention of the powder process.

The method also allows the production of metallic articles that have within them non-metallic material. This advantage is utilized in the making of the synthetic abrasive, known as carboloy, a dense, hard tool material that is about 90 per cent. tungsten carbide and the remainder cobalt. Tungsten carbide is nearly as hard as diamond. When pressed and then sintered, the powder mixture can be tooled into proper shape. Heat treatment in hydrogen turns it into the finished carboloy that forms superior tools and dies.

One of the most important applications of powdered metal is in the making of the so-called "oilless bearings." When soaked in oil the bearings made by the powdered metal process take up enough lubricant in their many fine pores to last the lifetime of the machine they serve.

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PHYSIOLOGY

Breathing of Living Tissue Is Disturbed by X-rays

X-RAYING living tissue apparently disturbs its respiration in such a way as to drive out hydrogen, and the loss of this hydrogen is probably largely responsible for the death of the tissue.

This discovery was made by V. Everett Kinsey of the Westinghouse Research Laboratories at East Pittsburgh. He X-rayed pieces of normal human muscle and of cancerous tissue removed in surgical operations, keeping his specimens in a specially built glass vessel to collect the gases given off for analysis. He found that hydrogen, not normally a by-product of respiration, is given off when either healthy or diseased tissue is X-rayed.

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• First Glances at New Books

Physics

A HISTORY OF EXPERIMENTAL PHYSICS—Carl Trueblood Chase—*D. Van Nostrand*, 195 p., \$2.25. The historical rise of experimental physics is the theme of this volume which includes a chronological table of eminent physicists. Dr. Robert A. Millikan in the foreword says: "It is, undoubtedly, one of the serious weaknesses in the training of the American student in physics, that he so seldom acquires an intimate understanding of the historical developments of the subject. I, myself, regard such historical perspective as essential to any thorough-going grasp of the principles of physics themselves."

Science News Letter, November 5, 1932

Psychology

MAN AS PSYCHOLOGY SEES HIM—Edward S. Robinson—*Macmillan*, 376 p., \$2.50. An enjoyable book. The first part discusses human nature and such questions as, "Why do we act as we do?" and "What is thought?" In the second section is discussed "Psychology—Its aims, its deeds, its follies." A bibliography is provided for each chapter, with non-technical literature indicated by asterisks.

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Television

FIRST PRINCIPLES OF TELEVISION—A. Dinsdale—*Wiley*, 241 p., \$3.50. The principal systems of television are described simply and accurately and this book will be of aid to those who wish a comprehensive account of the various methods. The author has been editor of the Television Magazine in England, but his information covers progress both here and in Europe.

Science News Letter, November 5, 1932

Chemistry

TRANSACTIONS OF THE INSTITUTION OF CHEMICAL ENGINEERS, Vol. 9, 1931—*Institution of Chemical Engineers, London*—212 p., £1 1s. A report of the activities of the organization and fourteen rather complete technical papers.

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Chemistry

BERYLLOUM—Translated by Richard Rimbach and A. J. Michel—*Chemical Catalog Co.*, 331 p., \$10. The production and use of beryllium is comprehensively considered in the reports of work carried out since 1923 at the Ger-

man Siemens-Konzern that are contained in this volume. The researches reported were begun in 1919 by Dr. Hans Goldschmidt, the inventor of the thermite process.

Science News Letter, November 5, 1932

General Science

MEET THE SCIENCES—William Marias Malisoff—*Williams & Wilkins*, 196 p., \$2.50. The serious layman who desires a panoramic view of the sciences can obtain it from this book. The author sets forth as the plan of the book: first, he introduces the scientist in a general way; second, he presents the round-table of the science; third, he treats the major sciences individually in three groups; fourth, he allows himself to comment on the place of science in modern life.

Science News Letter, November 5, 1932

Public Health

PREVENTION OF AUTOMOBILE ACCIDENTS—Victor W. Pagé—*Henley*, 172 p., 75 cents cloth, 50 cents, paper. A handbook of interest to those who drive.

Science News Letter, November 5, 1932

Engineering

SMOKE AND ITS PREVENTION—H. M. Faust—*Ohio State University*. A brief bulletin of elementary and fundamental information, published as Engineering Experiment Station Circular 24.

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General Science

RECENT PROGRESS AND CONDITION OF MUSEUMS—Laurence Vail Coleman—*Govt. Print. Off.*, 34 p., 10c. A report on the progress in museums during 1929 and 1930. This pamphlet is an advance issue of Chapter XXII of the Biennial Survey of Education, 1928-1930 of the U. S. Office of Education.

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Psychology

INDUSTRIAL PSYCHOLOGY—Morris S. Viteles—*Norton*, 652 p., \$5.50. A comprehensive volume which would serve well either as textbook or reference work for employers.

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Chemistry

FREE ENERGIES OF SOME ORGANIC COMPOUNDS—George Sutton Parks and Hugh Martin Huffman—*Chemical Catalog Co.*, 251 p., \$4.50. This volume of the American Chemical Society monograph series was written to facilitate the application of thermodynamics to organic chemistry. Says the preface: "The organic chemist has been remarkably successful in developing his science, primarily with the aid of one tool—the principle of valence. By means of this tool he has been able to classify more than one-quarter of a million compounds and to correlate their properties in a highly satisfactory manner. Again by means of it he has predicted the possible existence of numerous compounds, hitherto unknown, and, through his previous correlations, has devised methods of preparing such compounds. And, in view of the present-day achievements of organic chemistry, rash indeed would be the man who might attempt to minimize the value of such a tool. We believe, however, that the time is now fast approaching when the orthodox organic chemist will find it advantageous to add to his kit some of those tools—thermodynamics, statistical mechanics and quantum theory—which have proven so helpful to his brother, the physical chemist. These newer tools will be added, not in order to discard those which the organic chemist has already employed so successfully but rather to supplement and reinforce the latter, particularly in the solution of special problems."

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Engineering

METHODS OF TEST RELATING TO ELECTRICAL INSULATING MATERIALS—*American Society for Testing Materials*—236 p., \$1.25. A reprint from the proceedings of the Society.

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Chemistry

QUANTITATIVE ANALYSIS—Edward G. Mahin—*McGraw-Hill*, 623 p., \$4. The fourth edition of a successful college text.

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